

write test features.

44. A drive for reading data on an optical media disk, said disk defining a plane, comprising:
a spin drive for rotating said disk about a first axis;

an arm, having an objective end, mounted for rotating said arm about a tracking axis to position said objective end in alignment with any of a plurality of radial positions of said disk, said tracking axis being substantially parallel to and spaced from said first axis said objective end being spaced from said disk a distance of at least about 50 micrometers ; and

a laser light source configured to provide laser light along a path to said objective end of said arm and thence to said disk; and

an optical detector which detects light reflected from said disk.

45. A drive, as claimed in claim 44, wherein said arm is further mounted for controllably moving said objective end along a path to adjust the distance of said objective end from said disk for focusing said laser light.

46. A drive, as claimed in claim 44, wherein moving said arm for focusing is performed while maintaining said objective end and said laser light source in a substantially constant spatial relationship with respect to one another.

47. A drive, as claimed in claim 44, wherein said arm is mounted to provide for translation of said arm in a direction substantially parallel to said first axis.

48. A drive, as claimed in claim 44, wherein said arm is mounted to provide for pivoting of said arm about an axis substantially parallel to the plane of said disk.

49. A drive, as claimed in claim 44, wherein said drive has a mass less than or equal to about 0.05 kg.

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50. A drive, as claimed in claim 44, wherein said drive fits within a rectangular envelope having a thickness less than or equal to about 10 mm.

51. A drive, as claimed in claim 44, wherein said drive fits within a rectangular envelope having a width less than or equal to about 60 mm.

52. A drive, as claimed in claim 44, wherein said drive fits within a rectangular envelope having a depth of less than or equal to about 50 mm.

53. A drive, as claimed in claim 44 further comprising a drive controller interface, wherein said drive controller interface is a universal serial bus interface.

54. An optical data drive, comprising:

a spin drive for rotating an optical media disk about a first axis, said disk defining a plane;

an arm, having an objective end, said arm movable to position said objective end in alignment with any of a plurality of radial positions of said disk;

a laser light source configured to provide laser light along a path to said objective end of said arm and thence to said disk; and

a universal serial bus data interface for communicating data between said drive and a host device.

55. An optics assembly for use in conjunction with an optical data disk, comprising:

a vertical cavity surface emitting laser (VCSEL);

a light detector; and

an optical relay system which guides at least some laser light from said VCSEL to a selectable region of said optical data disk and which guides at least a portion of reflected light from said optical data disk to said light detector.

56. An optics assembly as claimed in claim 55 wherein said VCSEL and said light detector are formed on a single integrated circuit substrate.

57. An optics assembly as claimed in claim 55 wherein said VCSEL and said light detector are mounted on a single substrate.

58. Apparatus for use in connection with optical data storage, comprising:

a storage medium wherein data bits written thereon bits can be distinguished using

reflected light, reflected from said storage medium;

a laser light source;

a detector;

an optical relay system which guides at least some laser light from said laser light source to a selectable region of said storage medium and which guides at least a portion of said reflected light from said storage medium to said detector;

wherein said laser light source and said detector are formed on a single integrated circuit substrate.

59. Apparatus, as claimed in claim 58, wherein said laser light source includes a surface emitting laser.

60. Apparatus, as claimed in claim 58, wherein said laser light source includes at least a first vertical cavity surface emitting laser (VCSEL).

61. Apparatus, as claimed in claim 60, wherein said VCSEL is used as at least part of said detector.

62. Apparatus, as claimed in claim 61, wherein said detector comprises a substantially radially symmetric arrangement which is substantially concentric with said laser light source.

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63. Apparatus, as claimed in claim 61, wherein said detector is laterally spaced a first distance from said laser light source.
64. Apparatus, as claimed in claim 63, further comprising a birefringent material sized and shaped to laterally offset a reflected beam from said laser light source by said first distance.
65. Apparatus, as claimed in claim 63, wherein said first distance is less than or equal to about 0.05 mm.
66. Apparatus, as claimed in claim 61, wherein said apparatus occupies a volume defining a form factor of less than or equal to about 60 mm in width, less than or equal to about 12 mm in height and less than or equal to about 50 mm in depth.
67. Apparatus, as claimed in claim 61, wherein said storage medium is a rotatable disk.
68. Apparatus, as claimed in claim 67, configured to facilitate end-user removal and replacement of said disk.
69. Apparatus as claimed in claim 67, wherein said rotatable disk is at least partially covered by a cartridge.
70. Apparatus as claimed in claim 69, configured to facilitate end-user removal and replacement of said cartridge and disk.
71. Apparatus, as claimed in claim 61, wherein said detector provides a data signal.
72. Apparatus, as claimed in claim 61, wherein said detector provides a focus error signal.
73. Apparatus, as claimed in claim 61, wherein said detector provides a tracking error signal.

74. Apparatus, as claimed in claim 61, wherein said detector is a phi-detector.
75. Apparatus for optical data storage comprising:
a rotatable, user-removable disk;
a drive, couplable to said disk, for rotating said disk about a first axis;
an optics arm having at least a laser source, a detector, an objective and a focus actuator,
and defining an objective end and a second end;
a tracking actuator, coupled to said arm to controllably rotate said arm about a second
axis, substantially parallel to, but spaced from said first axis, to position said objective end at
desired radial locations adjacent said disk.
76. Apparatus as claimed in claim 75 wherein the location and mass of components of said
arm are such that said rotation about said second axis imparts a moment of inertia of less than or
equal to about 5 gm-cm².
77. Apparatus as claimed in claim 75 wherein the location and mass of components of said
arm are such that said rotation about said second axis imparts a moment of inertia of less than or
equal to about 1 gm-cm².
78. Apparatus as claimed in claim 75 further comprising a prism.
79. Apparatus, as claimed in claim 78, wherein said focus actuator adjusts the distance of said
detector from said prism.
80. Apparatus, as claimed in claim 75, wherein said focus actuator adjusts the distance of said
objective end from said disk.
81. Apparatus, as claimed in claim 75, wherein said focus actuator comprises a piezo-motor.

82. Apparatus, as claimed in claim 75, wherein said laser source, detector and objective are all positioned with respect to said optics arm on the same side of said second axis.

83. Apparatus, as claimed in claim 82, wherein said laser source, detector and objective are all positioned substantially adjacent said objective end of said optics arm.

84. Apparatus, as claimed in claim 75 wherein each of said laser source and objective defines an optical axis and wherein the optical axes of said laser source and objective are coaxial.

85. Apparatus for optical data storage comprising:

a rotatable, user-removable disk;

a drive, couplable to said disk, for rotating said disk about a first axis;

an optics system having at least a laser source, a detector, and an objective;

a focus actuator for moving at least a portion of said optics system for adjusting focus of light from said laser source on said disk, wherein said moving is performed while maintaining at least said laser source and said objective in a fixed spatial relationship with respect to one another.

86. Apparatus, as claimed in claim 85, wherein a distance, along an optical path from said laser source to said objective, remains substantially constant during said moving for adjusting focus.

87. Apparatus for optical data storage comprising:

a user-removable disk, rotatable about a first axis, to define a disk plane;

a drive, couplable to said disk, for rotating said disk about a first axis;

an optics arm having at least a laser source, a detector, and an objective;

a focus actuator for controllably pivoting said optical arm about an axis substantially parallel to said disk plane for adjusting focus of light from said laser source on said disk.

88. Apparatus for optical data storage comprising:
 - a user-removable disk, rotatable about a first axis, to define a disk plane;
 - a drive, coupleable to said disk, for rotating said disk about a first axis;
 - an optics arm having at least a laser source, a detector, and an objective;
 - a focus actuator for controllably translating said optical arm in a direction substantially parallel to said first axis for adjusting focus of light from said laser source on said disk.
89. A user-removable optical data disk, said disk having a diameter less than or equal to about 35 mm.
90. A disk, as claimed in claim 89, wherein said disk is at least partially hard-formatted.
91. A disk, as claimed in claim 89, wherein said disk is at least partially pre-recorded.
92. A user-removable cartridge for housing an optical data disk, said cartridge having a thickness less than or equal to about 3 mm a width less than or equal to about 40 mm and a depth less than or equal to about 40 mm
93. A cartridge, as claimed in claim 92, wherein said disk is at least partially hard-formatted.
94. A cartridge, as claimed in claim 92, wherein said disk is at least partially pre-recorded.
95. A drive for reading or writing data from or to an optical data recording disk, said drive having a thickness less than or equal to about 12 mm, a width less than or equal to about 55mm and a depth less than or equal to about 40 mm.
96. A user-removable optical data recording cartridge comprising:
 - a first-surface optical recording medium having at least a first optically recordable and readable surface;

5 a cartridge body, with said medium positioned therein, so as to permit rotation of said medium in said cartridge body.

97. A user-removable optical data recording cartridge comprising:
a first-surface optical medium having at least a first optically readable surface;
a cartridge body, with said medium positioned therein, so as to permit rotation of said medium in said cartridge body.
98. A user-removable optical data recording disk comprising:
a first-surface optical medium having at least a first optically readable surface having at least first data or servo features embossed therein.

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